



GERMAN **QUALITY**

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**kronos**metal

ANDALUZİT TDS & MSDS DOKÜMANLARI  
ANDALUSITE TDS & MSDS DOCUMENTS



# kronosmetal

GERMAN QUALITY

## ANDALUZİT ANDALUSİTE

Andaluzit, esas olarak ısıya dayanıklı refrakter ürünlerin imalatında kullanılan alümina-silikat bir hammaddedir. Andaluzit üretildiğinde diğer birçok refrakter hammaddeden farklı olarak maliyetli kalsinasyona gerek duyulmaz. Andaluzit içeren refrakter hammaddelerin pişirilmesinde yüksek mukavemetli mullit oluşur ve bu da üstün niteliklere neden olur.

- Andaluzit nispeten düşük sıcaklıklarda mullite dönüşümü, yüksek sıcaklık mukavemeti ve fiziksel-kimyasal erozyona direnci, cüruf penetrasyonuna ve alkali saldırısına karşı çok iyi direnç sağlar.
- Andaluzit içeren refrakter malzemeleri yüksek sıcaklıklarda minimum hacim değişimiyle refrakterin boyut değişimi minimize edilmiş olur.
- Yüksek sünme ve aşınma direnci, yüksek sıcaklıklarda yüksek mukavemet, kimyasal ve fiziksel erozyona direncine sahiptir.
- Monolitik refrakterlerde andaluzit kullanıldığında, pişirmedeki çok düşük hacim değişikliğinin de avantajıdır.
- Cüruf ve gazların etkisine ve nüfuzuna karşı dirençlidir.
- Düşük akı içeriği cüruflara ve alkalilere karşı dirence yardımcı olur.

Andalusite is an alumina-silicate raw material used principally in the manufacture of heat resistant refractory products. When andalusite is produced, unlike many other refractory raw materials, costly calcining is not required. On firing refractory raw materials containing andalusite, high strength mullite is formed, resulting in the superior qualities of.

- Andalusite conversion to mullite at relatively low temperatures, imparting high hot strength and resistance to physical-chemical erosion, with very good resistance to slag penetration and alkali attack.
- Minimum volume change when firing andalusite - containing refractory materials; dimension control of the refractory is improves.
- High creep and abrasion resistance, high strength at high temperatures, resistance to chemical and physical erosion.
- The very low volume change on firing is also advantageous when andalusite is used in monolithic refractories.
- Resistance to attack and penetration by slag and gases.
- The low flux content helps the resistance to slags and alkalies.

### Kullanım Alanları;

Andaluzit esaslı refrakterler esas olarak demir ve çelik yapımında, çoğunlukla yüksek fırınlar, soba tuğlası makinelerinde, torpido transferinde, sıcak metal karıştırıcılarda, döküm potalarında ve indüksiyon fırınlarında monolitik astarlarda kullanılır, Andaluzit malzeme çimento fırınlarında, camda kullanılır. Endüstriyel fırınlarında ve içinde. Andaluzit refrakterleri, yüksek yüklerin ve yüksek sıcaklıkların bulunduğu aşındırıcı koşullar altında da etkin bir şekilde kullanılmak tadır. Ayrıca baca astarlarında ve fırın mobilyalarında, monolitik dökülebilir astarlarda, tokmak karışımlarında ve ısı eşanjörlerinde, ısı işlem fırınlarında. Batı Yarımküre'de andaluzit tüketimi geleneksel olarak düşük seviyede, sınırlı bulunabilirlik nedeniyle dünyadaki endüstriyel fırınlar artık dünya standartlarını da bir andaluziti etkin bir şekilde kullanarak maliyetleri düşürme fırsatına sahiptir. Andaluzitimizin tipik fiziksel / kimyasal özellikleri % 59 Al<sub>2</sub>O<sub>3</sub> ve Fe<sub>2</sub>O<sub>3</sub> % 0.80'dir. Diğer teknik özellikler için firmamızla iletişime geçiniz.

**Refrakter Sektörü;** Refrakter uygulamalarda, andaluzit kullanımının birçok faydası vardır. Hacim stabilitesi, yük altında çok iyi sünme direnci ve refrakterlik, yüksek termal şok direnci, iyi kimyasal saldırı, cüruf ve metal penetrasyon dirençleri.

**Döküm Sektörü;** Modern kum döküm sürecinde, döküm kalitesini artırmak ve kusur riskini azaltmak için andaluzit esaslı özel kumlar kullanılmaktadır. Düşük ısı genleşmesi ve yüksek refrakterliği nedeniyle Andalusite, damarsız ve finisajsız demir ve çelik döküm için ideal çözümdür.

**Seramik Sektörü;** Andaluzit, seramik malzeme desteğinin fiziksel, kimyasal özelliklerinin daha iyi kontrol edilmesi gerektiğinde karlı bir şekilde kullanılabilen doğal bir alümina ve mullit kaynağıdır. Yüksek saflığı ve çok ince parçacık boyutu dağılımı nedeniyle, mikronize andaluzit, sırlar ve engobeler için opaklaştırıcı olarak zirkon silikata verimli ve ekonomik bir alternatiftir.

**Fırın Mobilyaları;** Andaluzit termal şok direnci, hacim kararlılığı ve yüksek sıcaklık yük dayanımı, bu doğal olarak oluşan kristalde benzersiz bir şekilde bir araya gelir.

### Application Areas;

Andalusite-based refractories are used principally in iron and steel making, mostly in monolithic linings in blast furnaces, stove brick and checkers, torpedo transfer, hot metal mixers, casting ladles, and induction furnaces, Andalusite shapes are used in cement kilns, the glass industry, in and in induction furnaces. Andalusite refractories are also used effectively under abrasive conditions where high loads and high temperatures exist. Also in stack linings and kiln furniture, monolithic castable linings, ramming mixes and heat exchangers, heat treatment furnaces. While andalusite consumption in the Western Hemisphere has traditionally been at a low level, because of restricted availability, industrial furnaces in the world have now the opportunity to reduce costs by effectively utilizing a world class andalusite. Typical physical / chemical characteristics of the our andalusite are 59% Al<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub> 0.80%. Contact our company for other technical specifications.

**Refractory Industry;** There are many benefits of using andalusite in refractory applications. Volume stability, Very good creep resistance and refractoriness under load, High thermal shock resistance, Good chemical attack, slag and metal penetration resistance.

**Casting Industry;** In the modern sand casting process, andalusite-based special sands are used to increase casting quality and reduce the risk of defects. Due to its low thermal expansion and high refractoriness, Andalusite is the ideal solution for iron and steel casting without veins and finishes.

**Ceramic Industry;** Andalusite is a natural source of alumina and mullite that can be profitably used when the physical and chemical properties of your ceramic material support need to be better controlled. Due to its high purity and very fine particle size distribution, micronized andalusite is an efficient and economical alternative to zircon silica as opacifier for glazes and engobes.

**Furnace Furniture Industry;** Andalusite thermal shock resistance, volume stability and high temperature load resistance uniquely combine in this naturally occurring crystal.



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### ANDALUZİT ANDALUSİTE

#### AVAILABLE SIZES ÜRÜN BOYUTLARI



#### PACKAGING AMBALAJ



25 kg bags on 1t pallets / 25 kg çuval 1 ton paletlerde

25 kg bucket on 1t pallets / 25 Kg kova 1 ton paletlerde

1 ton loose in a big bag / 1 tonluk bigbag

#### Product name Average grain size Ortalama tane boyutu (mm)

Coarse Premium Andalusite İri Taneli Premium Andalusit	3 – 5
Medium Coarse Premium Andalusite Orta İri Taneli Premium Andalusit	0,5 – 3
Fine Premium Andalusite İnce Taneli Premium Andalusit	0 – 0,5
Powder Premium Andalusite Öğütülmüş Toz Premium Andalusit	0

Other grain sizes can be produced if required.  
Gerektiğinde diğer tane boyutları da üretilebilir.

#### COARSE PREMIUM ANDALUSITE 3 - 5 mm.

CHEMICAL ANALYSIS									
	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	L.O.I
Typical (%)	58	38.97	0.87	0.18	0.17	0.2	0.16	0.64	0.71
Guarantee (%)	≥57	≤ 1							
CHEPA57: 3-5 mm Grain Size Distribution (mm)									
	<2,8	2,8-4	4-4,7	> 4,7					
Typical (%)	4.2	53.7	36.5	5.6					
Range (%)	<5	45-55	30-40	5-10					
Specific Gravity (g/cm <sup>3</sup> )	3.1								
Moisture (%)	≤0.5								

#### COARSE PREMIUM ANDALUSITE 0,5 - 3 mm.

CHEMICAL ANALYSIS									
	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	L.O.I
Typical (%)	59.6	38.65	0.46	0.11	0.06	0.08	0.07	0.34	0.51
Guarantee (%)	≥58	≤ 0.6							
CHEPA58: 0.5-3 mm Grain Size Distribution (mm)									
	0-0.6	0.6-1.4	1.4-2.36	2.36-3.35	> 3.36				
Typical (%)	9.5	32.9	41.2	16.4	0.0				
Range (%)	5-15	25-35	35-45	10-20	0				
Specific Gravity (g/cm <sup>3</sup> )	3.1								
Moisture (%)	≤0.5								

#### FINE PREMIUM ANDALUSITE 0 - 0,5 mm.

CHEMICAL ANALYSIS									
	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	L.O.I
Typical (%)	59.6	38.65	0.46	0.11	0.06	0.08	0.07	0.34	0.51
Guarantee (%)	≥58	≤ 0.6							
CHEPA58: 0-0.5 mm Grain Size Distribution (mm)									
	0-0.09	0.09-0.150	0.150-0.600	> 0.600					
Typical (%)	45.5	15.5	37.5	1.5					
Range (%)	60-40	10-20	30-40	<3					
Specific Gravity (g/cm <sup>3</sup> )	3.1								
Moisture (%)	≤0.5								

#### POWDER PREMIUM ANDALUSITE

CHEMICAL ANALYSIS									
	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	L.O.I
Typical (%)	59.6	38.65	0.46	0.11	0.06	0.08	0.07	0.34	0.51
Guarantee (%)	≥58	≤ 0.6							
CHEPA: Milled Sizing (Mesh)									
	100	200	325	600					
Sizing (Micron)									
	150	75	45	25					
Product Size [D95 (Micron)]									
	150	75	45	25					
Specific Gravity (g/cm <sup>3</sup> )	3.1								
Moisture (%)	≤0.5								





## MATERIAL SAFETY DATA SHEET – MSDS COARSE/FINE/POWDER PREMIUM GRAIN

### 1. IDENTIFICATION OF SUBSTANCE

**Name of the Material:** Andalusite Mineral  
**Common Name:** Andalusite  
**Suitable use:** Refractory Raw Material  
**Name of the Product:** PREMIUM ANDALUSITE (COARSE/FINE/POWDER GRAIN)  
**Similar products:** Kyanite, Sillimanite, Bauxite, Kronos Metal A.S.  
**Manufacturer:** Ozalper Mah. Kemal Tahir Sokak, Milano Plaza, Kat:2, No: 4, P.K.: 44090 Yesilyurt, Malatya / Turkey  
**Contact:** Phone: +90 422 502 10 35  
 E-mail: info@kronosmetal.com.tr

### 2. COMPOSITION / DATA ON COMPONENTS

#### Chemical characterization

· **Description:** Mixture of the substances listed below with non-hazardous additions.

#### · Components:

INGREDIENTS	WEIGHT (%)	OSHA PEL (Only for Dust)
SiO <sub>2</sub> Silicon dioxide	39-41	6 mg/m <sup>3</sup>
Al <sub>2</sub> O <sub>3</sub> Alumina	58-60	10mg/m <sup>3</sup> (total dust)
Fe <sub>2</sub> O <sub>3</sub> Iron oxide	0.5-1.0	10 mg/m <sup>3</sup> (as Fe)

All of the ingredients are hard solids and not powders (NON DUSTY INGREDIENTS).

The PEL values are based on an 8-hour sampling average. The substances regulated by OSHA are particulates; otherwise they are not regulated. The established PEL value is 15 mg/m<sup>3</sup> of total powder, and 5 mg/m<sup>3</sup> of the breathable fraction.

Smaller quantities of silicates (non-free crystalline silica), oxides and/or vitreous phases can be present but they are not considered an inhalation risk.

### 3. HAZARDS IDENTIFICATION

**Hazard description:** Non-toxic

#### Medical conditions aggravated by exposure to the product:

The primary entrance route of the fine particles of this product is through inhalation and through the skin, but not by other means, as by ingestion. The potential health hazard can be the irritation of the eyes, of the skin, or of the breathing tract. The chronic effects are: red eyes, dermatitis, or pneumoconiosis. None of the ingredients described in Section 2 are carcinogenic.

#### Information pertaining to particular dangers for man and the environment:

The product must be labelled in accordance of the latest version of the calculation procedures of the "General Classification guidelines for preparations of the EU".  
 Can be irritating to eyes, respiratory system and skin.

**NFPA ratings (scale 0-4)** Health = 1, Fire = 0, Reactivity = 0  
**HMIS Classification** Health = 1, Fire = 0, Reactivity = 0

<b>HEALTH HAZARD</b> 4 - Deadly 3 - Extreme Danger 2 - Hazardous 1 - Slightly Hazardous 0 - Normal Material	<b>FIRE HAZARD - Flash Point</b> 4 - Below 73F 3 - Below 100F 2 - Below 200F 1 - Above 200F 0 - Will Not Burn
<b>SPECIFIC HAZARD</b> OXY - Oxidizer ACID - Acid ALK - Alkali COR - Corrosive *W- Use NO WATER ☢ Radiation Hazard	<b>REACTIVITY</b> 4 - May Detonate 3 - Shock and Heat May Detonate 2 - Violent Chemical Change 1 - Unstable If Heated 0 - Stable

### 4. FIRST AID MEASURES

**After inhalation:** Move to fresh air; consult doctor if needed.  
**After skin contact:** Immediately wash with water and soap and rinse thoroughly.  
**After eye contact:** Flush eyes with water for 15 minutes. If irritation persists, consult a doctor.  
**After swallowing:** This product is intended for industrial applications; in the unlikely event that this product is swallowed, a physician should be consulted.

### 5. FIRE FIGHTING MEASURES

**Suitable extinguishing agents:** Use fire fighting measures that suit the environment.  
**Protective equipment:** No special measures required.

### 6. ACCIDENTAL RELEASE MEASURES

Pick up the grains and return them to their respective bags. If powder was generated, gather it by means of a soft sweeping or by means of aspiration with a vacuum machine. People doing this work must use the appropriate protectors as specified in Section 8. The uncleaned materials should be disposed of according to that specified in the Section 13.

### 7. HANDLING & STORAGE

**Information for safe handling:** Ensure good ventilation/exhaust at the workplace. Avoid formation of dust.  
**Information on protection against explosions and fires:** Keep respiratory protective device available.

#### Storage:

- No special requirements.
- Information about storage in one common storage facility: Not required.
- Further information about storage conditions: Store product inside, avoiding extreme weather conditions.

### 8. EXPOSURE CONTROLS & PERSONAL PROTECTION

- **Engineering Controls:** Ventilation Systems and control processes may be necessary in order to maintain the contamination levels of the powders of this product during their use within the levels OSHA of Section 2.
- **General protective and hygienic measures:** Keep away from foodstuffs, beverages and food. Wash hands before work breaks and at the end of work. Store protective clothing separately. Avoid contact with the eyes and skin.
- **Breathing equipment:** NIOSH approved respirators should be used when dust is present. A respiratory protection program should be implemented if exposures exceed OSHA PEL's.
- **Protection of hands:** Protective gloves recommended. The glove material must be impermeable and resistant to the product. In the absence of tests, no recommendation on the glove material can be given for this product or its preparation. Selection of the glove material to be based on consideration of the penetration times, rates of diffusion, wear and degradation.
- **Eye protection:** Safety glasses with side shields recommended

### 9. PHYSICAL & CHEMICAL PROCESS

**Form:** Solid- Coarse grains  
**Color:** Light Pink  
**Odor:** No specific odor.  
**Density (H<sub>2</sub>O=1):** 3,04–3,08  
**Solubility in / Miscibility with Water:** Insoluble.  
**Melting point/Melting range:** Over 2000 °C  
**Boiling point/Boiling range:** Undetermined.  
**Flash point:** Not applicable.  
**Auto igniting:** Product is not self-igniting.  
**Danger of explosion:** Product does not present an explosion hazard.

### 10. STABILITY & REACTIVITY

**Chemical stability:** This product is stable under normal conditions of shipment, storage and processing.  
**Condition to Avoid:** None.  
**Incompatible materials:** It can react with strong acids such as hydrofluoric acid.  
**Risky decomposition or Decomposition products :** None.  
**Risky polymerization:** Not applicable.

### 11. TOXICOLOGICAL INFORMATION

Just as has been indicated above, the coarse ingredients of this product are not toxic, neither carcinogenic in the state in which they are shipped. However, in a very fine state it can affect the eyes and the breathing system.

### 12. ECOLOGICAL INFORMATION

In the event of accidental spillage, it is unlikely that there would be echotoxicity or environmental damage because of the product.

### 13. DISPOSAL CONSIDERATION

Recommendation for Disposal of Product: As sold, recycling of this product is not dangerous. Final use condition must be evaluated prior to disposal. Dispose of waste product in accordance with Federal, State and Local regulations.

### 14. TRANSPORT INFORMATION

#### DOT regulations:

- Hazard class: -,
- Land transport ADR/RID (cross-border):-,
- ADR/RID class: -,
- Maritime transport IMDG:-,
- IMDG Class: -,
- Air transport ICAO-TI and IATA-DGR:-,
- ICAO/IATA Class: -.

**Transport/Additional information:** Not dangerous according to available information, but in the event of accidents, apply that specified in Section 6.

### 15. REGULATION

Kronos Metal A.S., as it has been specified above, considers that this product possess a risk only as the OSHA defines it in the Hazardous Standard Communications.

### 16. OTHER INFORMATION

This MSDS contains information and recommendations of reliable origin. All data shown is subject to reasonable variations; it is submitted at the buyer's request and it is not considered as part of any contract or sale condition.

This MSDS is only applicable to the product in its original state since its characteristics might be changed as per the application to which it has been subject. The buyer is responsible for determining the security, toxicity and applicability of the product under his own operational conditions. The buyer is also responsible for the distribution of MSDS Data to employees and direct users of the product.

Kronos Metal A.S. is not legally responsible for any loss or damage that occurs direct or indirectly from the use of this product, and does not assume any obligation or legal responsibility for the trust put into the information contained in this document.



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